

SCLERIA LACUSTRIS (CYPERACEAE), AN AQUATIC AND WETLAND SEDGE INTRODUCED TO FLORIDA

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ABSTRACT

A non-native species of *Scleria*, *S. lacustris* is reported from six counties and three major hydrologic regions in Florida. Biogeography and habitat in Florida are addressed. A description, key features and illustration are presented.

RESUMEN

Se presenta aquí la presencia de una especie exótica del género *Scleria*, *S. lacustris*, de seis condados y de tres regiones hidrológicas de Florida. Se hacen anotaciones sobre su biogeografía y hábitat en Florida. Se presenta una descripción con características clave junto con una ilustración.

A robust, annual member of its genus, *Scleria lacustris* C. Wright is being found with increasing frequency in freshwater marshes of peninsular Florida. This noteworthy species is native to scattered regions of the Neotropics and Africa (Core 1936; Hennessy 1985). Adventive populations have been documented in six counties located in the headwaters of three major USGS hydrologic regions: the Upper St. Johns River, the Kissimmee River, and the Big Cypress Swamp drainages.

Scleria lacustris was first reported in 1998 based on a 1989 specimen from a Lee County wetland in the upper reaches of the Big Cypress Swamp drainage (Wunderlin 1998; Tobe et al. 1998). In 1990 it was documented at a wetland eight km east and noted as the dominant plant (M. Roessler, pers. comm.) Not recognized at the time was a 1988 specimen from Jane Green Swamp, a conservation marsh in the St. John's Water Management District, Brevard County in eastern Florida. The Brevard County specimen had been misidentified as *Scleria vaginata* Steudel. In 1999 *S. lacustris* was documented in the Kissimmee River drainage of central Florida in Polk County at the Disney Wilderness Preserve (DWP) and at London Creek, two km west of DWP boundaries. The following year additional stations were found within DWP (Polk and Osceola Counties), and east of DWP on South Florida Water Management District conservation lands. Since 2000, collections have been made from St. Johns River Water Management District marshes in Indian River County and from the lower Kissimmee drainage in Okeechobee County. These latest stations lie south of the earliest locale (Brevard County) where recollection has also been made (Fig. 1).

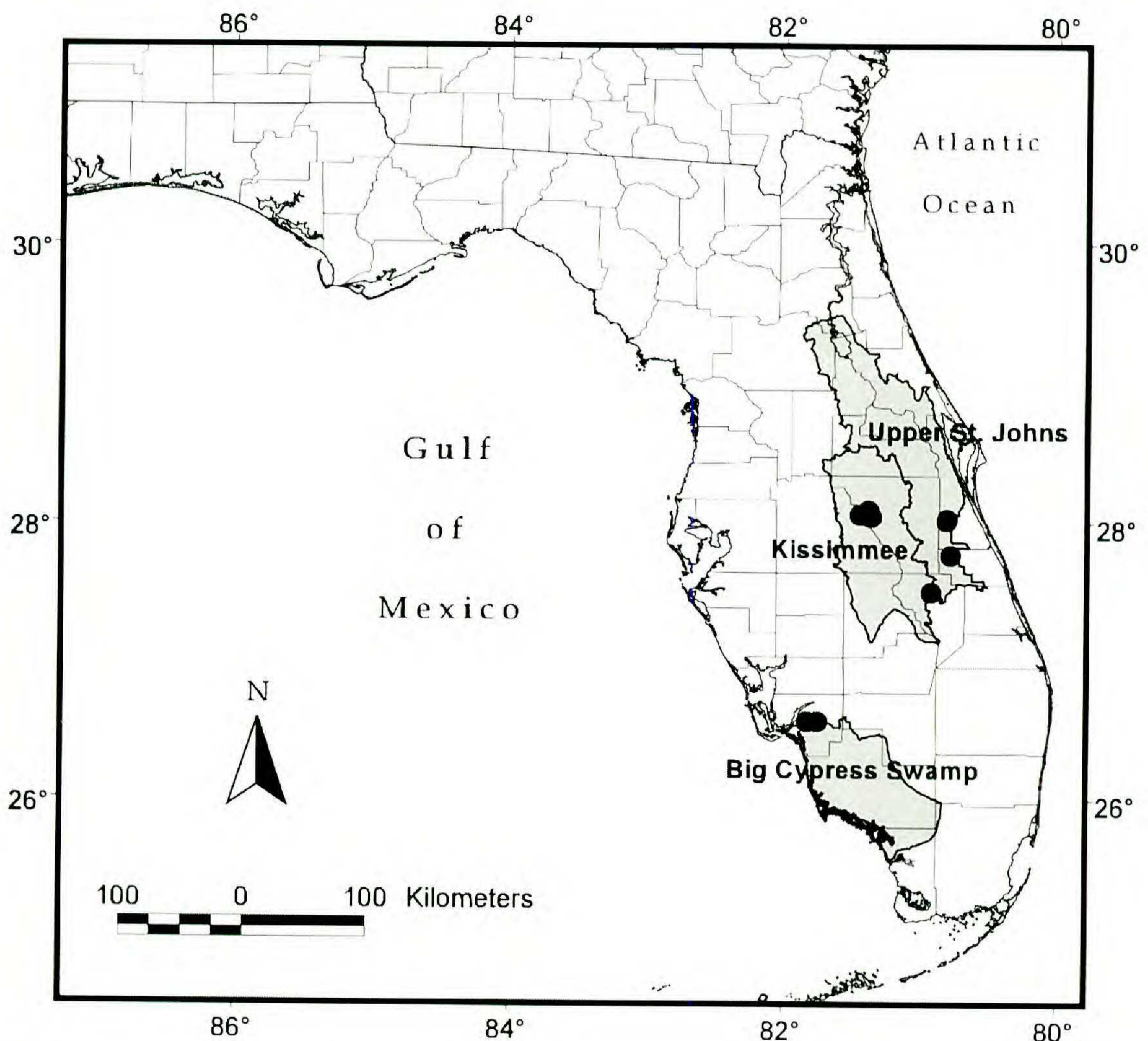


FIG. 1. Geographic distribution of *Scleria lacustris* in Florida. Collection sites are indicated by dots. USGS hydrologic regions are shaded in gray and delineated with bold lines. From left to right they represent drainages of the Big Cypress Swamp, the Kissimmee River, and the Upper St. Johns River.

Scleria stands apart from other genera in the Cyperaceae for its unisexual flowers and prominent, white, bone-like achenes (Kessler 1987). The genus is distributed primarily in tropical and warm-temperate regions. Kessler (1987) recognized and described ten North American species of *Scleria*, placing emphasis on the sculpturing of achenes and pubescence on the achenes, scales, bracts, leaves, and culms. Camelbeke and Goetghebeur (1999) used the ligule as a diagnostic character in *Scleria* and presented a key to the five ligulated Neotropical species so far known. In the Americas, the Neotropical *S. lacustris* was most recently treated by Core (1936). Hennessy (1985) most recently detailed the species from Africa.

Scleria lacustris lacks a genuine ligule, but does have a sheath-top extension called a contraligule (Camelbeke & Goetghebeur 1999; Fig. 2c.). The contraligule for this species has a membranous margin, which Core (1936) de-

scribed but failed to accurately account for in his key. All Florida specimens exhibit this margin; a scarious, tongue-shaped appendage, 2–5 mm long, at the top of the contraligule. It is also apparent in a digital image, *Wright s.n.* (NY) (NYBG 2001).

Core (1936) believed *Scleria lacustris* to be endemic to the type locality of Cuba; only three specimens from two locales were available on which to base his description. Fairey (1972) discovered that the original notes for Core (1936) described leaves as “6 mm to 1.6 cm wide.” This differs from “1–6 mm wide,” an error that appeared in the published monograph (Core 1936). Florida plants, 61 to about 230 cm in height, stand two to three times taller than specimens from Cuba. Also the leaf width is broader, 11–25 mm wide. Consistently larger material was collected in the St. Johns drainage where plants grew emergent from water. These plants were taller, with solitary culms, long panicles (to 21 cm) and adventitious roots up to 44 cm above the culm base. In these respects plants from the St. Johns drainage bore a greater resemblance to *S. lacustris* described from aquatic habitats in Africa (Hennessy 1985; Robinson 1966; Nelmes 1955). African plants originally described as *S. aquatica* Cherm. are considered conspecific with *S. lacustris* (Nelmes 1955; Hennessy 1985; Fairey 1972). The African entity as a whole is infrequently distributed in six countries across tropical Africa and in Madagascar (Hennessy 1985).

Fairey (1972) examined both Neotropical and African specimens of *Scleria lacustris* and found African plants taller and more robust, with larger, better-developed panicles. He noted leaves on African specimens as acute and those on Neotropical plants as obtuse. Core (1936) described Cuban plants with obtuse leaves. In Florida, the leaves of *S. lacustris* are acute; they gradually taper to a point. Fairey (1972) attributed differences between Neotropical and African representatives of *S. lacustris* to their wide geographical separation.

In the Neotropics, *Scleria lacustris* is now known to range far beyond Cuba. Camelbeke confirmed specimens from Costa Rica, Cuba, Jamaica, Guyana, Suriname, French Guiana, Brazil and Paraguay, but within this wide distribution still regards *S. lacustris* as “a very rare species” (K. Camelbeke, pers. comm.).

In Florida, *Scleria lacustris* exists as an annual species, recurring by seed in locally abundant populations. Seedlings emerge in late spring. Flowering occurs August to September and achenes remain on standing plants September through December. By February plants in the St. Johns drainage were collapsed with bases and roots withered. Persisting structures are absent in Florida, although *S. lacustris* may perenniate in Africa (Nelmes 1955; Fairey 1972, Hennessy 1985).

Throughout its Florida range, *Scleria lacustris* resides in seasonal marshes in or near former wet cattle pasture. The mechanisms of introduction and dispersal are not known. According to Hennessy (1985), the achenes sink in water, yet, one hundred achenes collected from the ground in May remained buoyant

in the laboratory for several days. Achenes floating through ditches and washed along lakeshores may explain spread in some regions. However, water flow cannot account for widely scattered populations in more isolated sites, suggesting dispersal by birds or other animals as an additional mechanism of introduction.

In marshes of the Upper St. Johns River drainage, *Scleria lacustris* is encountered as scattered patches approximately five m² to several hectares in size on slight rises in peat substrate. Plants are observed in drier years and may require recession of standing water for seedling recruitment. However, mature specimens collected in late season are commonly found growing in water to one m (L. & J. Harrison, pers. comm.). Drier conditions existed at DWP in the Kissimmee River drainage, where *S. lacustris* was observed during 2000 at approximately 20 stations (C. Campbell, pers. comm.). At that time colonies reaching 1.8 ha were found at marshes, ditches, and lakefronts remaining dry after several years of extreme drought. Hennessy (1985) suggested that the annual habit, uncommon in the subgenus *Scleria*, serves as a drought-escape mechanism in tropical regions that experience seasonal drought. The increasing occurrence of *S. lacustris* in Florida marshes could be related to changing hydrologic conditions.

Scleria lacustris can be recognized in the field by its large size, thick three-sided culms and broadly linear, plicate leaves. Terminal panicles may extend over 1–2 meter in height and are open and conspicuous when achenes mature. Plants are extremely scabrous, especially leaf margins, midribs, rachis and bracts. The harsh texture results from minute prickles, developed as barbed outgrowths of silica deposited in the epidermal cells (Metcalf 1971). Seedlings are bright green, with purple tinged basal sheaths, red roots and tapering, plicate leaves.

The hypogynium, a hardened pad at the base of the achene, is an important taxonomic feature in *Scleria*. Wunderlin's (1998) key, in addressing Florida, distinguishes *S. lacustris* from North American species and groups *S. lacustris* with *S. triglomerata* in having a smooth-surfaced achene and a hypogynium without tubercles. Wunderlin (1998) separated *S. lacustris* from *S. triglomerata* by noting the broad, crusty hypogynium and the narrower leaves of *S. triglomerata* versus the narrow, smooth hypogynium and the wider leaves of *S. lacustris*.

Kessler (1987) noted the achene body of *S. triglomerata* as ovoid-globose, and pointed to the resulting circular base of the achene as a key element. The achene body of *S. lacustris* appears more ovoid-ellipsoid and its achene base more triangular. Addition of these elements after line 3 in the key of Kessler (1987) is as follows:

1. Achene body smooth or with longitudinal ridges _____ (2)
1. Achene body rough, reticulate or with transverse ridges.
 2. Base of achene circular to obtusely triangular, with a hypogynium _____ (3)
 2. Base of achene triangular without a hypogynium.

3. Tubercles present between achene and hypogynium _____ ***Scleria oligantha***
 3. Tubercles absent between achene and hypogynium _____ (4)
 4. Hypogynium broad, granular- or papillose- crusty; base of achene circular;
 leaves less than 1 cm wide _____ ***Scleria triglomerata***
 4. Hypogynium narrow, smooth; base of achene obscurely triangular; leaves
 greater than 1 cm wide _____ ***Scleria lacustris***

The following description of *Scleria lacustris* in Florida, adapted from Core (1936), is based on all specimens reviewed and six unvouchered plants from Indian River County.

Scleria lacustris C. Wright in Sauvalle, *Anales Acad. Ci. Med. Habana* 8:152. 1871.
 (Fig. 2) TYPE: CUBA: Wright s.n. (LECTOTYPE: K; designated by E.A. Robinson, *Kew Bull.* 18:517–519. 1966).

Common names.—Wright's Nut-rush, Cañuella, Little Cane

Robust, annual herb 0.6–2.3 m tall. *Rhizome* absent. *Roots* stout and fibrous, at base and submersed nodes of culm, red-brown. *Culms* erect, solitary to several, often with 1–2 undeveloped basal tillers, 8–24 mm thick near base to 5–13 mm thick aerially, triquetrous with angles retrorsely scabrous. *Leaf blades* 41–90 cm long, 11–25 mm wide, acute, plicate, transverse section inversely W-shaped, glabrous, margins and midribs scabrous; sheaths scarcely winged, loose, closed, tinged with purple streaks, sheath hairs strigose to hispid, white and sparkling; ligule absent; contraligule rounded, 3–12 mm long, 6–17 mm wide at base, the margin with a scarious appendage, appendage triangular to tongue shaped, 2–5 mm long. *Inflorescence* open paniculate, the branches ascending to spreading, rigid, antrorsely scabrous, axillary and terminal, terminal inflorescence 19–48 cm long; lower bract of inflorescence foliaceous, 9–30 cm long, 5–1.6 mm wide, bractlets to 48 mm long, < 1 mm wide, antrorsely scabrous, awl shaped from broadened base, base margined with dark bristles. *Spikelets* both bisexual and male. *Staminate spikelets*, 4–5 mm long, 0.8–1.2 mm wide, scales lanceolate, mucronate, maroon to dark purple, flower with 3 stamens. *Gynecandrous spikelets* common, 4.5–6.5 mm long, pistillate scales 3–4.5 mm long, 2.4–4 mm wide, broadly ovate, abruptly acuminate, ciliolate on the margin, maroon to dark purple. *Androgynous spikelets* less common. *Achene* 3–4 × 2.3–2.5 mm, ovoid- ellipsoid, faintly three sided, base obscurely triangular, smooth, shining, white to mottled gray or tan, equaling or exceeding the scales. *Hypogynium* small, depressed 0.5–<1 mm, obtusely triangular to three lobed, the margin entire, narrow, 0.1–0.2 mm high, tan to brown.

Voucher specimens: **U.S.A. FLORIDA. Brevard Co.:** Rare, growing in water, Jane Green Swamp, W. of Lake Hell'n Blazes, near W property boundary, about 14 mi WSW of Melbourne, ca. 28°02'N, 80°48'W, 6 Oct 1988, G.B. Hall s.n. (FLAS!), duplicate specimen originally determined as *Scleria vaginata* Steudel.; Jane Green Swamp, St. Johns Water Management District; UTM 3099747.5 N, 518595.9 W, abundant at this station, growing in 14 cm of water, freshwater marsh with *Rhynchospora inundata*, *Cyperus articulatus*, *Pontederia cordata*, *Sagittaria lancifolia*, *Panicum hemitomon*, *Polygonum punctatum*, *Leersia hexandra*, *Cyperus haspan*, 21 Oct 2000, J. Harrison & L. Harrison 259 with K. Snyder (FLAS!).



FIG. 2. *Scleria lacustris* C. Wright drawn from *Harrison & Harrison 259* by Laura Line. A. Achene, profile and base with hypogynium. B. Habit. C. Portion of culm showing leaf, sheath and contraligule. D. Spikelets.

Indian River Co.: Blue Cypress Marsh, ca. 600 m E of northern section of Blue Cypress Lake, Nov 2000, *G. Nichols s.n.* (FLAS!); Blue Cypress Marsh, ca. 600 m E of northern section of Blue Cypress Lake, 27°41.869'N, 80°41.659'W withered plants with *Eleocharis*, 10 Feb 2001, *C.C. Jacono 204* with *G. Nichols* (FLAS!); Blue Cypress Marsh, 27° 41.869' N, 80° 41.659' W, immature plants 150 cm high growing in 76 cm of water, 16 Aug 2001, *G. Nichols s.n.* (FLAS!). **Lee Co.:** ca. 10 mi SE of Ft. Myers, herbaceous wetland, 27 Nov 1989, *W. Cox s.n.* (USF); ca. 10 mi SE of Ft. Myers, herbaceous wetland, 16 Dec 1989, *W.*

Cox s.n. (USF; FLAS!); wet prairie along Griffin Dr., 0.5 mi N of Gateway Blvd., in the Gateway Community, Nov 1990, *M. Roessler s.n.* (FTG, scanned image seen; USF), specimen originally determined as *Scleria triglomerata* Michx. **Okeechobee Co.:** Approx. 5 mi W of US 441 on SR 724, approx. 50 m from wetland edge, 19 Sep 2000, *C. Lane s.n.* (FLAS!). **Osceola Co.:** Disney Wilderness Preserve, HU3T4, along transect in HU, cypress dome community, 40–50 plants, *C. Campbell s.n.* 16 Oct 2000 (dwp!). **Polk Co.:** London Creek, Tract A. Oct 1999, *C. MacGregor s.n.* (USF!); Disney Wilderness Preserve, N side of Lake Hatchineha, ditch of N side lakefront road, water depth 45 cm, colony 9 m diameter, P. Royston, 8 Nov 1999 (PIHG!); Disney Wilderness Preserve, HUT, Aug 2000, *C. Campbell s.n.* (dwp!); just W of Dead River on Johnson Island, McKinney Tract, T28S R30E Sec.13, open marsh with *Sagittaria lancifolia* and *Sacciolepis striata*, 12 Oct 2000, *B. Hansen 12,894* with *R. P. Wunderlin & C. MacGregor* (USF!); Disney Wilderness Preserve, N side of Lake Hatchineha, S of the T off old marsh front road, seedlings 11–13 cm tall with empty pericarp attached, 7 May 2001, *C.C. Jacono 266 w/V. Ramey, C. Campbell and K. Yeuell* (FLAS!); Disney Wilderness Preserve, N side of Lake Hatchineha, S of the T off old marsh front road, mature plant cultivated from seedling collected 7 May 2001, 11 Sep 2001, *C.C. Jacono 309* (FLAS!).

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